

Amendment

U.S. Patent Application No. 09/475,385

**REMARKS**

Reconsideration and continued examination of this application are respectfully requested. Full support for the amendments to the application can be found throughout the present application and/or are editorial in nature. In particular, the title has been modified to reflect the elected invention as requested by the Examiner. The title uses language found in claim 18. Furthermore, the § 120 data has been added to page 1 of the application. As recognized by the Examiner, the present application is a divisional of earlier filed U.S. Patent Application No. 08/663,709 filed June 14, 1996. The copy of the Declaration that was submitted in the parent application was filed with this application and therefore is of record with the United States Patent and Trademark Office. The patent numbers corresponding to the application numbers set forth at page 7 of the present application have been added, where possible. The new claims further define what Applicants regard as their invention. Full support can be found in the application as originally filed including, but not limited to, pages 7, 13-16 and 19 as well as the examples. Accordingly, entry of this amendment is respectfully requested since no questions of new matter should arise.

In the Office Action, at pages 2 and 3, the Examiner sets forth the reasons for the Restriction Requirement. While Applicants do not agree with the Examiner's position and believe that the remaining claims should be examined, to expedite the prosecution of the application, the non-elected claims have been cancelled by way of this amendment. Applicants reserve the right to pursue the subject matter set forth in the non-elected invention by the filing of one or more divisional applications.

At page 3 of the Office Action, the Examiner provides comments regarding the Information Disclosure Statement that has been filed in this application. While the undersigned appreciates that

## Amendment

U.S. Patent Application No. 09/475,385

numerous documents are set forth in the Information Disclosure Statement, the undersigned and the Applicants do wish to point out to the Examiner that, in the parent application, documents not relating to adsorption were unfortunately considered relevant by the parent Examiner. Accordingly, these references have been identified by way of an Information Disclosure Statement in this application in order to avoid any inconsistency with the references identified to the Examiner in the parent application. With respect to the list of documents set forth in the Information Disclosure Statement, Applicants wish to point out that particularly relevant documents are the documents assigned to the assignee of the present application, namely Cabot Corporation, such as U.S. Patent No. 5,554,739 relied upon by the Examiner in one of the rejections in this Office Action. In addition, the references set forth at page 1 of 13 of the Form PTO-1449 filed December 30, 1999 would also be considered of particular relevance. However, the Examiner is encouraged to review all of the documents identified in the Form PTO-1449 as required. With respect to the application numbers identified at page 13 of 13 of the Form PTO-1449, these patent applications have issued as U.S. patents as indicated. In order to provide this information to the Examiner, a copy of the Form PTO-1449 listing these patent applications is attached along with the corresponding patent numbers. Based on this, Applicants believe that the Examiner's request has been fully responded to. If the Examiner requires any additional information, the Examiner is respectfully requested to contact the undersigned. The Examiner is now respectfully requested to sign and date the Form PTO-1449, and return a copy to Applicants.

At the bottom of page 3 and continuing on the top of page 4, the Examiner objects to the oath or declaration and requests a Supplemental Oath or Declaration under 37 CFR § 1.67. For the following reasons, this request is respectfully traversed.

C

## Amendment

U.S. Patent Application No. 09/475,385

Under 37 CFR § 1.67, a Supplemental Oath or Declaration may be requested when there are certain deficiencies or inaccuracies as set forth in 37 CFR § 1.67(a), which does not apply here since there are no deficiencies or inaccuracies with respect to the copy of the Declaration that was submitted from the parent application. With respect to 37 CFR § 1.67(b), a Supplemental Oath or Declaration meeting the requirements of § 1.63 must be filed when a claim is presented for matter originally shown or described but not substantially embraced in the statement of invention or claims originally presented. Applicants respectfully point out that this subsection of 37 CFR § 1.67 does not apply here. In particular, when the Declaration was signed by the inventors for the parent application, the claims as originally pending were claims 1-27 as set forth in the present application as filed. These claims clearly describe an adsorbent composition containing modified carbonaceous material and a method to increase the adsorption capacity of a carbonaceous material by modifying the carbonaceous material wherein at least one organic group is attached onto the carbonaceous material. The claims further describe a method to adsorb an adsorbate by contacting the adsorbate with a modified carbonaceous material wherein an organic group is attached to the carbonaceous material to form the modified carbonaceous material. In addition, ion exchange materials are claimed. Further, the statement of invention including the title mentioned modified carbon adsorbents and processes for adsorption using the same. Clearly, all of this evidence shows that the claims as pending and in particular claim 18 as amended are clearly embraced by the claims as originally filed as well as the statement of invention. Accordingly, Applicants believe that a Supplemental Oath or Declaration is not required under 37 CFR § 1.67 and the Examiner is respectfully requested to reconsider this objection. Accordingly, this objection should be withdrawn.

Amendment

U.S. Patent Application No. 09/475,385

At page 4 of the Office Action, the Examiner objects to the disclosure because the parent application, namely U.S. Patent Application No. 08/663,709 is not referenced in the present application. As pointed out above, the parent application is now referenced at page 1 of the present application by way of this Amendment. Accordingly, this objection should be withdrawn.

At the bottom of page 4 of the Office Action, the Examiner rejects claims 18, 19, 21, and 22 under 35 USC §102(b) as being anticipated by U.S. Patent No. 5,554,739 to Belmont. The Examiner asserts that Belmont teaches a modified activated carbon that can be used as an adsorbent and further discloses an organic alkyl or aromatic group attached to the carbon. For the following reasons, this rejection is respectfully traversed.

The present application, as appreciated by the Examiner, is a divisional of U.S. Patent Application No. 08/663,709 that was filed June 14, 1996. Since the present application is an identical copy of the parent application, the present application is entitled to benefit from the earlier filed parent application under 35 U.S.C. § 120. Since the Belmont patent issued September 10, 1996, Belmont cannot be prior art to the present application under 35 U.S.C. § 102(b). Accordingly, for this reason alone, this rejection should be withdrawn.

Furthermore, and to assist the Examiner, Applicants respectfully point out that the inventor of the '739 patent is Belmont who is one of the same inventors of the present application. Furthermore, the application resulting in the '739 patent was incorporated in its entirety by reference in the present application.

At page 5 of the Office Action, the Examiner rejects claims 18, 19, 21, 22, 23, and 24 under 35 U.S.C. § 102(b) as being anticipated by Sutt, Jr. (U.S. Patent No. 4,528,281). The Examiner asserts that Sutt, Jr. relates to carbon molecular sieves for selectively adsorbing gases or liquids.



**Amendment**

U.S. Patent Application No. 09/475,385

The material of Sutt, Jr., according to the Examiner, is an activated carbon substrate having a polymer impregnated on its surface by a coating process. The Examiner further asserts that the polymer mentioned in Sutt, Jr. can contain polar alkyl and aromatic groups such as phenols and cyclic polyesters made from alkyl monomers. For the following reasons, this rejection is respectfully traversed.

Sutt, Jr. does relate to molecular sieves which contain a carbonaceous substrate which can include molecular sieve carbon. As mentioned in Sutt, Jr., the carbonaceous substrate is impregnated with an organic polymer having a molecular weight of at least 400. It is important for the Examiner to fully appreciate the interaction between the carbonaceous substrate and the organic polymer as shown in Sutt, Jr. In more detail, and as discussed in Sutt, Jr., for instance at column 2, beginning at line 45, polymers are used to partially block the macropore structure of the carbonaceous substrate. This is further described at column 5 of Sutt, Jr. Sutt, Jr. does not teach the attachment of any organic group onto the carbonaceous substrate. At best, Sutt, Jr. merely shows the coating of the polymer onto the carbonaceous substrate which is not an attachment and certainly is not the type of attachment recited in claim 18 of the present application. Furthermore, there is no mention in Sutt, Jr. whatsoever of an aromatic group or C<sub>1</sub>-C<sub>12</sub> alkyl group being directly attached to the carbonaceous material. As described in the present application and in the applications recited at page 7, the present invention involves an attachment of an organic group onto carbonaceous material preferably by a chemical reaction. See page 7 of the present application. This type of attachment is not a mere coating and results in the actual attachment of organic groups onto the carbonaceous substrate and not merely the blocking of pores on a carbonaceous substrate by coating the substrate. Accordingly, the material used in the methods of the present invention are quite

**Amendment**

U.S. Patent Application No. 09/475,385

different from the materials used in Sutt, Jr. This is further shown, for the Examiner's convenience, at column 7, lines 53-64 of Sutt, Jr., wherein it is clear that only a coating of the carbonaceous substrate is occurring and nothing else. Accordingly, for these reasons, this rejection should be withdrawn.

At the bottom of page 5 of the Office Action, the Examiner then rejects claim 20 under 35 U.S.C. § 103(a) as being unpatentable over Belmont (U.S. Patent No. 5,554,739). The Examiner essentially relies on the same reasons as the § 102(b) rejection above, and further asserts that it would be obvious to one skilled in the art to use a sodium, lithium, or potassium salt of a sulfophenol group in order to provide a group that is providing the desired hydrophilic polar effects. For the following reasons, this rejection is respectfully traversed.

For the reasons set forth above, as indicated, Belmont is not prior art to the present invention under 35 U.S.C. § 102(b). Since at best, Belmont is prior art only under 35 U.S.C. § 102(e) and the present application was filed December 30, 1999, and in view of the common ownership of the '739 patent and the present application, Belmont would not be prior art to the present invention in view of 35 U.S.C. § 103(c). Accordingly, this rejection should be withdrawn as well.

At the bottom of page 5 of the Office Action and continuing onto to page 6, the Examiner then rejects claim 25 under 35 U.S.C. § 103(a) as being unpatentable over Sutt, Jr. in view of Tanaka et al. (U.S. Patent No. 3,960,771). The Examiner relies on Sutt, Jr. for the reasons set forth above in the § 102 rejection. The Examiner further asserts that Tanaka et al. relates to an activated carbon coated with a phenol hydrophilic group for adsorbing water molecules as well as odor causing gases such as ammonia. Accordingly, the Examiner concludes that it would have been

## Amendment

U.S. Patent Application No. 09/475,385

obvious to one having ordinary skill in the art to use a hydrophilic-modified activated carbon material to adsorb water in order to provide an adsorbate that is abundant and inexpensive to separate water vapor molecules from an air stream as well as other pollutants that are typically adsorbed. For the following reasons, this rejection is respectfully traversed.

The differences between the claimed invention and Sutt, Jr. as explained above with respect to the § 102 rejection apply equally here and are incorporated herein. As a summary, Sutt, Jr. does not show the use of the modified carbonaceous material that is set forth, for instance in claim 18 or claim 25 which is ultimately dependent on claim 18. In particular, Sutt, Jr. merely shows the coating of a polymer onto a carbonaceous substrate with no attachment occurring whatsoever as explained above. Tanaka et al. does not overcome any of these serious deficiencies of Sutt, Jr. since Tanaka et al. merely relates to a composite adsorbent and there is no teaching or suggestion whatsoever of attaching an organic group such as recited in claims 18 and 25 to a carbonaceous material in order to modify the carbonaceous material. The particular passages relied upon by the Examiner do not teach or suggest the attachment of an organic group. Therefore, the deficiencies of Sutt, Jr. are not taught or suggested by Tanaka et al. Furthermore, the combination of Sutt, Jr. and Tanaka et al. would not teach or suggest the claimed invention since neither reference teaches or suggests a method of using a modified carbonaceous material wherein the modified carbonaceous material is an organic group attached onto a carbonaceous material such that an aromatic group or a C<sub>1</sub>-C<sub>12</sub> alkyl group is directly attached to the carbonaceous material.

In addition, the Applicants wish to direct the Examiner's attention to the present application which further describes the various benefits achieved by the present invention. In particular, one advantage of the present invention not mentioned in this cited art is the ability to combine different



## Amendment

U.S. Patent Application No. 09/475,385

benefits  
organic groups. As explained for instance at page 19 of the present application, more than one type of organic group can be attached to carbonaceous material or the use of a combination of carbonaceous materials having different organic groups can be used. Also, varying degrees of modification with respect to the level of organic group attached onto the carbonaceous material is possible to further control the ability to adsorb certain materials. Mere coatings do not typically have these benefits.

In addition, with the attachment of organic group or groups onto a carbonaceous material, the adsorbent composition is capable of adsorbing an adsorbate quite selectively which is not possible with conventional carbonaceous material which is unmodified. As explained in detail at the bottom of page 20 and continuing onto page 21 of the present application, with the present invention, one can selectively adsorb particular species from a multicomponent mixture. With the present invention, an adsorbent composition can decrease adsorption affinity for one component in order to maximize the adsorption affinity of another component which will maximize separation of the second component from the first component. In addition, by increasing the adsorption of polar species, this further results in the relatively decreased adsorption of non polar species which improve selectivity. Other advantages are further described at pages 21 and 22 and the examples of the present invention show the advantages of the modification of carbonaceous materials such as carbon black and activated carbon. Finally, a mere coating of carbonaceous materials will not stand up to a variety of adsorptions or separations since the coating may be removed during separation operations, whereas the attachment of organic groups is much more resistant to a variety of materials that are run through the adsorbents. Accordingly, the present invention has advantages not appreciated or suggested by the cited references. For all of these reasons, this rejection should be

C



Amendment

U.S. Patent Application No. 09/475,385

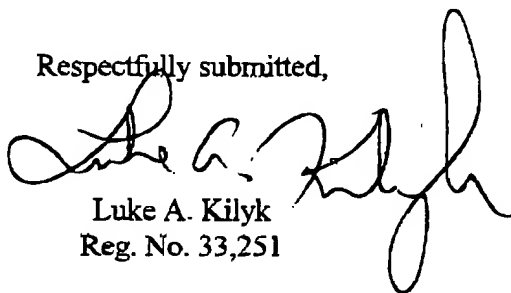
withdrawn.

**CONCLUSION**

In view of the foregoing remarks, Applicants respectfully request the reconsideration of this application and the timely allowance of the pending claims.

If there are any other fees due in connection with the filing of this response, please charge the fees to deposit Account No. 03-0060. If a fee is required for an extension of time under 37 C.F.R. § 1.136 not accounted for above, such extension is requested and should also be charged to said Deposit Account.

Respectfully submitted,



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Amendment

U.S. Patent Application No. 09/475,385

**VERSION WITH MARKINGS TO SHOW CHANGES MADE**

At Page 7, please replace the second paragraph, lines 7-15 with the following:

-- The carbonaceous material described above is then modified by the attachment of an organic group to the carbonaceous material. Preferred processes for attaching an organic group to a carbonaceous material are described in detail in U.S. Patent Application Nos. 08/356,660, now abandoned; 08/572,525, now U.S. Patent No. 5,851,280; 08/356,459, now U.S. Patent No. 5,559,169; and 08/356,653, now U.S. Patent No. 5,554,739, all incorporated in their entirety by reference herein. These processes can be preferably used in preparing the modified carbon adsorbents of the present invention and permit the attachment of an organic group to the carbonaceous material via a chemical reaction. As indicated above, the organic group attached to the carbonaceous material is one preferably capable of increasing the adsorption capacity of the carbonaceous material.--